Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A method for metallizing one or more sites of a nucleic acid molecule comprising:

hybridizing the nucleic acid molecule to one or more sets of two oligonucleotide probes;

providing palladium ions;

contacting the palladium ions and a nucleic acid molecule under conditions effective to bind the palladium ions on one or more sites of the nucleic acid molecule; wherein the palladium ions more strongly associate with the nucleic acid molecule than with other sites, to prevent general and spontaneous deposition of the palladium ions on sites other than the nucleic acid molecule; and

contacting the nucleic acid molecule having palladium ions bound to one or more of its sites with nickel or nickel alloy under conditions effective to deposit nickel or nickel alloy on the nucleic acid molecule.

2. (original) The method according to claim 1, wherein the nucleic acid molecule is selected from the group consisting of DNA, RNA, chemically modified nucleic acid molecules, and nucleic acid analogs.

3. (original) The method according to claim 1, wherein the palladium ions are in a solution comprising palladium acetate, acetone, and water.

4. (original) The method according to claim 1, wherein the palladium ions are in an aqueous solution of palladium chloride.

5. (original) The method according to claim 1, wherein said contacting the palladium ions and a nucleic acid molecule is carried out for about 1 second to about 1 hour.

6. (original) The method according to claim 1, wherein the nickel or nickel alloy is an electroless nickel plating solution.

7. (original) The method according to claim 1, wherein said contacting the nucleic acid molecule having palladium ions bound to one or more of its sites with nickel or nickel alloy is carried out for about 1 second to about 1 hour.

8. (original) The method according to claim 1 further comprising:

washing away excess palladium ions from the nucleic acid molecule prior to said contacting the nucleic acid molecule having palladium ions bound to one or more of its sites with nickel or nickel alloy.

9. (previously presented) A method for detecting a target nucleic acid molecule in a sample comprising:

providing a device for detecting the presence of a target nucleic acid molecule in a sample comprising:

two electrical conductors, including a first electrical conductor and a second electrical conductor, wherein the electrical conductors are not in contact with one another and

one or more sets of two oligonucleotide probes attached to the electrical conductors, wherein the probes are positioned such that they cannot come into contact with one another and such that a target nucleic acid molecule, which has two sequences, a first sequence complementary to a first probe attached to the first electrical conductor and a second sequence complementary to a second probe attached to the second electrical conductor, can bind to both probes;

contacting the probes with a sample which may have the target nucleic acid molecule under selective hybridization conditions to permit target nucleic acid molecules, if any, present in the sample to hybridize to both of the probes and form a complex of the target nucleic acid molecule hybridized to the probes;

providing palladium ions;

contacting the palladium ions with the device after said contacting the probes with the sample under conditions effective to bind the palladium ions on one or more sites of any of

the complex of the target nucleic acid molecules hybridized to the probes; wherein the palladium ions more strongly associate with the target nucleic acid molecule than with other sites, preventing general and spontaneous deposition of the palladium ions on sites other than the target nucleic acid molecule;

contacting the device with nickel or nickel alloy under conditions effective to deposit nickel or nickel alloy on the complex; and

determining if an electrical current can be carried between the probes, said electrical current between the probes indicating the presence of the target nucleic acid molecule in the sample.

10. (original) The method according to claim 9, wherein the target nucleic acid molecule is selected from the group consisting of DNA, RNA, chemically modified nucleic acid molecules, and nucleic acid analogs.

11. (original) The method according to claim 9, wherein the palladium ions are in a solution comprising palladium acetate, acetone, and water.

12. (original) The method according to claim 9, wherein the palladium ions are in an aqueous solution of palladium chloride.

13. (original) The method according to claim 9, wherein the sample is saliva, whole blood, peripheral blood lymphocytes, skin, hair, or semen.

14. (original) The method according to claim 9, wherein said method is used to detect infectious agents.

15. (original) The method according to claim 9, wherein said method is used for nucleic acid sequencing.

16. (original) The method according to claim 9, wherein said contacting the palladium ions and the device is carried out for about 1 second to about 1 hour.

17. (original) The method according to claim 9, wherein the nickel or nickel alloy is in an electroless nickel plating solution.

18. (original) The method according to claim 9, wherein said contacting the device with nickel is carried out for about 1 second to about 1 hour.

19. (original) The method according to claim 9 further comprising:

washing away excess palladium ions from the complex prior to said contacting the device with nickel or nickel alloy.

20. (original) The method according to claim 9, wherein the probes are complementary to sequences from the genetic material of a pathogenic bacteria.

21. (original) The method according to claim 20, wherein the pathogenic bacteria is a biowarfare agent.

22. (original) The method according to claim 20, wherein the pathogenic bacteria is a food borne pathogen.

23. (original) The method according to claim 9, wherein the probes are complementary to sequences from the genetic material of a virus.

24. (original) The method according to claim 9, wherein the probes are complementary to sequences from the genetic material of a human.

25. (original) The method according to claim 9, wherein one or both of the probes has a sequence which is complementary to a sequence having a polymorphism, wherein the base or bases complementary to the polymorphism are located at an end of the probe distal to the conductors.

26. (currently amended) A method for metallizing one or more sites of a nucleic acid molecule comprising:

hybridizing the nucleic acid molecule to one or more sets of two oligonucleotide probes;

providing stannous ions;

contacting the stannous ions and a nucleic acid molecule under conditions effective to bind stannous ions on one or more sites of the nucleic acid molecule; wherein the stannous ions more strongly associate with the nucleic acid molecule than with other sites, preventing general and spontaneous deposition of the stannous ions on sites other than the nucleic acid molecule; and

contacting the nucleic acid molecule having stannous ions bound to one or more of its sites with silver under conditions effective to deposit silver on the nucleic acid molecule.

27. (previously presented) A method for detecting a target nucleic acid molecule in a sample comprising:

providing a device for detecting the presence of a target nucleic acid molecule in a sample comprising:

two electrical conductors, including a first electrical conductor and a second electrical conductor, wherein the electrical conductors are not in contact with one another and

one or more sets of two oligonucleotide probes attached to the electrical conductors, wherein the probes are positioned such that they cannot come into contact with one another and such that a target nucleic acid molecule, which has two sequences, a first sequence complementary to a first probe attached to the first electrical conductor and a second sequence complementary to a second probe attached to the second electrical conductor, can bind to both probes;

contacting the probes with a sample which may have the target nucleic acid molecule under selective hybridization conditions to permit target nucleic acid molecules, if any, present in the sample to hybridize to both of the probes and form a complex of the target nucleic acid molecule hybridized to the probes;

providing stannous ions;

contacting the stannous ions with the device after said contacting the probes with the sample under conditions effective to bind the stannous ions on one or more sites of any of the complex of the target nucleic acid molecules hybridized to the probes; wherein the stannous ions more strongly associate with the target nucleic acid molecule than with other sites, preventing general and spontaneous deposition of the stannous ions on sites other than the target nucleic acid molecule;

contacting the device with silver under conditions effective to deposit silver on the complex of the nucleic acid molecules hybridized to the probes; and

determining if an electrical current can be carried between the probes, said electrical current between the probes indicating the presence of the target nucleic acid molecule in the sample.

28. (withdrawn) A method of attaching nucleic acid molecules to electrically conductive surfaces, said method comprising:

providing first and second electrical conductors comprised of nickel, the electrical conductors being located near, but not in contact with one another, wherein the first electrical conductor is plated with gold from a gold cyanide solution and the second electrical conductor is plated with gold from a gold sulfite solution;

attaching a first set of oligonucleotide probes to the second electrical conductor with an attachment chemistry which binds the first set of oligonucleotide probes to the second electrical conductor but not to the first electrical conductor; and

contacting the first and second electrical conductors with a solution comprising a second set of oligonucleotide probes in an acidic pH buffer after said attaching, wherein the acidic pH buffer alters the gold on the first electrical conductor but not on the second electrical conductor such that the second set of oligonucleotide probes attach to the first electrical conductor with an attachment chemistry which binds the second set of oligonucleotide probes to the first electrical conductor.

29. (withdrawn) A method of attaching nucleic acid molecules to electrically conductive surfaces, said method comprising:

providing first and second electrical conductors comprised of nickel, the electrical conductors being located near, but not in contact with one another, wherein the first electrical conductor is plated with gold;

attaching a first set of oligonucleotide probes to the first electrical conductor with an attachment chemistry which binds the first set of oligonucleotide probes to the first electrical conductor but not to the second electrical conductor;

contacting the first electrical conductor with a thiol-containing blocking agent under conditions effective to bind gold at all sites not occupied by the first set of oligonucleotide probes;

plating the second electrical connector with gold; and

attaching a second set of oligonucleotide probes to the gold on the second electrical conductor but not the first electrical conductor with an attachment chemistry which binds the second set of oligonucleotide probes to the gold of the second electrical conductor.

30. (withdrawn) A method of attaching nucleic acid molecules to electrically conductive surfaces, said method comprising:

providing first and second electrical conductors comprised of gold, the electrical conductors being located near, but not in contact with one another, wherein the first electrical conductor is plated with a cover layer of metal other than gold;

attaching a first set of oligonucleotide probes to the second electrical conductor with an attachment chemistry which binds the first set of oligonucleotide probes to the second electrical conductor but not to the first electrical conductor;

removing the cover layer of metal from the first electrical conductor; and

attaching a second set of oligonucleotide probes to the first electrical conductor but not the second electrical conductor with an attachment chemistry which binds the first set of oligonucleotide probes to the first electrical conductor.

31. (withdrawn) A method of attaching nucleic acid molecules to electrically conductive surfaces, said method comprising:

providing first and second electrical conductors, the electrical conductors being located near, but not in contact with one another, wherein the second electrical conductor is

comprised of gold and the first electrical conductor is comprised of an outer layer of metal other than gold;

attaching a first set of oligonucleotide probes to the second electrical conductor with an attachment chemistry which binds the first set of oligonucleotide probes to the second electrical conductor but not to the first electrical conductor;

plating the first electrical conductor with gold such that the gold covers the layer of metal; and

attaching a second set of oligonucleotide probes to the first electrical conductor but not the second electrical conductor with an attachment chemistry which binds the second set of oligonucleotide probes to the first electrical conductor but not to the second electrical conductor.

32. (previously presented) A method for detecting a target nucleic acid molecule in a sample comprising:

providing a device for detecting the presence of a target nucleic acid molecule in a sample comprising:

two electrical conductors, including a first electrical conductor and a second electrical conductor, wherein the electrical conductors are not in contact with one another and

one or more sets of two oligonucleotide probes attached to the electrical conductors, wherein the probes are positioned such that they cannot come into contact with one another and such that a target nucleic acid molecule, which has two sequences, a first sequence complementary to a first probe attached to the first electrical conductor and a second sequence complementary to a second probe attached to the second electrical conductor, can bind to both probes;

contacting the probes with a sample which may have the target nucleic acid molecule under selective hybridization conditions to permit target nucleic acid molecules, if any, present in the sample to hybridize to both of the probes and form a complex of the target nucleic acid molecule hybridized to the probes;

attaching to the probes and any target nucleic acid molecule metal ions; wherein the metal ions more strongly associate with the target nucleic acid molecule than with other sites,

preventing general and spontaneous deposition of the metal ions on sites other than the target nucleic acid molecule; and

determining the presence of the target nucleic acid molecule in the sample by detecting the scatter of light caused by the metal ions attached to the probes and any target nucleic acid molecule.